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PHYSICAL AND SOCIAL DOMINANCE IN MATE CHOICE

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Abstract

The aim of this research project is to determine the whether dominance or attractiveness plays a stronger role in mating success in males. This is to be done by utilizing affiliated group members from fraternities, taking various biological measures, self-reports, and group ratings for dominance factors. These individuals would then be rated by associated sorority members for their attractiveness. These results will then be analyzed for their role in mating success.

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Physical and Social Dominance in Mate Choice

Natural selection favors traits that increase reproductive success, and, in sexually reproducing species, reproductive success depends in large part on access to mates. Sexual selection is the type of natural selection that favors traits that enhance access to a higher number or quality of mates. There are various mechanisms by which sexual selection can occur. The first mechanism is mate choice. Mate choice occurs when an individual selects its mate based on behavioral, physical, or even territorial factors about the potential mate (Puts, 2010). Another mechanism is sperm competition. This involves competition between two or more males' sperm for a female's egg. This can be achieved through behavioral adaptations, and even creating multiple types of sperm (Wedell, Wiklund, & Bergstrom, 2009). Sexual coercion can also be used as a mechanism to enhance access to mates. Another mechanism is contest competition, where males use aggressive acts or the threat of aggression against other males to control mate access (Puts, 2010).

While mate choice is something that modern Western society is familiar with, the environment in which we evolved was quite different from our lives today. The autonomy that many, especially women, have in choosing their partners may not have existed (Puts, 2010). In looking at the dimension of our mating environment and our most closely related species, there is reason to believe that contest competition played a more significant role than did female choice in shaping men's traits. Humans live in what would be termed a two-dimensional mating environment, rather than a one-dimensional mating environment, such as a tunnel, or three-dimensional such as an aquatic environment (Puts, 2010). A two-dimensional mating environment allows for more control of mates, unlike in a three-dimensional environments, where there it is more difficult to control access to mates (Puts, 2010). With only two-dimensions it is

easier for males to restrict access to mates by competing with each other for access and mate guarding. This can be seen in examining other species mating strategies such as terrestrial arthropods, who often engage in more intense contest competitions for mates than their airborne relatives like butterflies (Puts, 2010). Also in looking at more closely related species, terrestrial primates have larger body size than their arboreal relatives, and males also have larger canines. This larger canine size is specifically important as it is only found in males and does not interfere with their ability to function in a three-dimensional environment (Puts, 2010).

The idea that the strongest or highest status men have the most wives and children appears incorrect in modern industrial nations; high status families today have fewer children (Perusse et al., 1993). It has been found that those with a higher level of prestige had more potential conceptions than those of lower social status. Perusse determined an individual's number of potential copulations from a series of factors that would determine reproductive process in the absence of contraception (Perusse et al., 1993). To determine the probability of conception per coital act, Perusse used a previously established method focusing on female fecundity, and the number of coital acts within a menstruating cycle (Bongaarts & Potter, 1983). This looks at the probability of all four biological stages of conception occurring: first that the cycle is ovulatory, then that insemination occurs during a fertile period, with that insemination leading to fertilization, and finally that fertilization leads to a recognizable conception (Bongaarts & Potter, 1983). By using an equation based on the probability of these events occurring, he found that 62% of the difference in number of potential copulations was associated with social status (Perusse et al., 1993). It is important to realize that the environment in which we live today is not the same environment in which we spent most of our evolution, but our ancestral environment has had lasting effects on our development and behavior.

Attractiveness is of central importance in mate choice. Various factors have been examined in researching attractiveness. Facial features are often examined when looking at attractiveness. Often this is examined as a matter of symmetry and masculinity, with those who are highly symmetrical and masculine having more short term sexual partners (Rhodes et al., 2005). These aspects have been found to be attractive cross culturally (Fink, & Penton-Voak, 2002). In addition, these features may also indicate genetic quality and healthy development (Rhodes et al., 2005). The attractiveness of male's bodies have also been rated and showed a similar trend as facial features. Those men with more symmetrical and masculinized bodies were found to have more short term partners (Rhodes et al., 2005). Also the averageness of faces is found to be attractive, perhaps because it signals a normal development (Thornhill, & Gangestad, 1993).

Contest competition as a mechanism focuses a great deal on dominance. Many sexually dimorphic human traits seem to be best explained by their benefits in male contest competition. These features include various elements of facial structure, such as pronounced brows and jaws to increase blow resistance with an increase in the cross-sectional area of the bone allowing for more resistance to blows without fracturing (Puts, 2010; Gaulin & Sailer, 1984). An increase in size and weight also increases the force with which one can inflict blows as well, making larger males better at contest competition for mates (Gaulin & Sailer, 1984).

Another trait that has been examined in regards to contest competition is voice pitch. There is a significant sex difference in voice pitch (Puts, Gaulin, & Verdolini, 2005). Low pitch in males has been found to signal physical dominance in nonhuman species, with lower frequencies indicating that the individual is likely to attack (Morton, 1977). In humans a low pitch is associated with more social dominance factors, with interpersonal and deference relationships with men lowering their voice pitch if they perceive themselves to be more dominant than the

individual they are addressing (Puts, Gaulin, and Verdolini, 2005). Men who have lower pitched voices have been found to report more sexual partners (Hodges-Simeon, Gaulin, & Puts 2010).

In looking at physical features beyond the face, research showed how muscle mass benefits males, even with the cost associated to muscle mass (Lassek & Gaulin, 2009). Researchers found that males who had higher fat free muscle and limb muscle volume had more sexual partners overall and in the past year, and also had their first sexual intercourse at an earlier age (Lassek & Gaulin, 2009). Women have also been shown in modern populations to prefer males with large muscle mass, upper body strength, and larger chest to waist ratio (Frederick & Haselton, 2007; Sawmi & Tovee, 2005; Fan, Dai, Liu, & Wu, 2005). The increase in muscle mass is useful in aggressive competition such as contest competition for mates (Lassek & Gaulin, 2009).

Also in looking at individuals who are involved in physical competition, researchers evaluated university level athletes and how their athletic performance was related to their number of sex partners (Faurie, Pontier, & Raymond, 2004). It was found that males who participated in competitive athletics on a regular basis had more sexual partners. Not only did simple involvement in competitive sports predict number of sexual partner, but also those with higher levels of performance within their sport had more partners than those with lower levels of performance (Faurie et al., 2004).

Not all features, though, fit cleanly into either category of dominance or attractiveness. Masculine faces are one feature that could potentially fall within either category. Masculine faces are often characterized by a strong jaw or heavy brow, which, while seen as attractive, can also be dominant, a trait that may provide blow resistance (Puts, 2010). Height is especially interesting, as taller men are perceived as more attractive, with men who have a higher stature

having more reproductive success on average (Sears, 2006). But height also provides a physical advantage in a fight, and is an imposing feature in men (Puts, 2010).

When these factors are examined, it becomes clear that it is important to determine the relative contributions of dominance and attractiveness to men's mating success. In order to do this, hard biological measurements must be compared to men's self-reports, and their peers rating of their dominance to support contest competition. In the present study members of a male fraternity will attend an initial session. During this session various measurements will be taken including, saliva for testosterone levels, blood for DNA, voice recordings, two-dimensional and three-dimensional photos, along with anthropometric measurements. They will also evaluate themselves through a questionnaire regarding their attractiveness, physical dominance, and leadership abilities, and also provide information on their sexual history and preferences. In the second session, male participants will then rate each other on their attractiveness, physical dominance, and leadership within the group.

Following the men first and second sessions, women from an associated sorority will then rate those men who participated on a series of different factors. These affiliated women will rate men on their attractiveness for short-term and long-term partners. These questions are more focused on the attractiveness of the males as a potential mate, rather than their level of dominance amongst their peers.

Most research on this subject previously has only had strangers rate men's attractiveness or dominance. By utilizing these groups it allows for individuals who are affiliated with each other to report on real social interaction. And while some research has been done with males rating peers for their dominance in regards to biological measures, there was not a rating by

associated women, to determine if it was actually attractiveness or dominance playing a role. The groups selected, fraternity members, and a partner sorority, provide a unique subject group to achieve these goals.

Methods

Participants

There are two groups of participants. The first is a group of 30 male participants. These individuals are undergraduate students and members of a fraternity at Penn State University, with an age range of 18 to 25 years old. Male participants will complete two sessions. From the fraternity an associated sorority will be selected and recruited, with female participants consisting of an estimated 50 individuals. The sorority will have attended social and charity events alongside the fraternity. These women are also undergraduates at the university and will complete one session.

Procedures

Male Participants

Session 1

In male participants' first session, a series of biological measures will be taken by the researcher. Following consent and screening for oral surgery and hormone-based medications, participants had their mouths flushed with distilled water. After ten minutes, the researcher instructed the participant on passive drool collection. Saliva samples were then chilled at 4 degrees Celsius for storage. Following saliva collection, participants provided a DNA sample to be used for MHC and ancestry informative markers. The DNA sample will then be taken by the researcher

through finger stick with the blood collected on Whatman FTA cards, allowing the card to dry for five minutes before it is stored.

The researcher will then take a series of anthropometric measurements from participants. First, height will be taken in centimeters and then weight in kilograms. Following these measurements, researchers will measure the men for chest, shoulder, and waist circumference using looping tailor's tape in centimeters. Male participant's biceps circumferences will then be measured by researchers for both arms, flexed and relaxed using the same looping tailor's tape in centimeters. Hand strength is then taken using a hand dynamometer in kilograms of force.

After completing these measures, the researcher will photograph the male participants using a Canon SLR. Investigators will instruct each man to maintain a neutral facial expression and remove any glasses or facial jewelry. The male participant's hair is held back from the face with spandex headbands to expose the hairline and ears. Then the researcher will capture a three-dimensional facial image using 3DMD software and camera, instructing the participant to maintain a neutral face with chin raised and with hair pulled back and glasses and facial jewelry removed as in the two-dimensional photos.

After photos are captured, the researcher will record the voice of the participant reading three standard passages. The first passage is the numerals one through ten, the second is a series of words starting with the consonant "B" and followed by all vowel sounds used in speech. The final passage contains all of the phonemes in the English language known as the "rainbow passage." The participants will be instructed by the researcher to stand in front of the wire guard, 9 cm distant from the microphone, and to speak in a conversational tone reading each passage. The recordings will be made using Praat software, mono sound settings, at 44100 Hz.

The investigator will then take a second sample of saliva through passive drool collection. These samples are chilled until storage.

Following measurements, participants are instructed by the researcher to complete a computer questionnaire. They are seated at a private laptop and answer basic questions about themselves. These questions including age, sexual history, preferences, and fantasies. The men will also be prompted to rate themselves on a scale of one to ten for various questions. These questions include “How attractive are you to women your age?” or “What percentage of men could you beat in a physical fight?” These prompts are used to get self-reports on attractiveness, physical dominance, and leadership abilities within the group.

Session 2:

During the second session, participants will complete a rating task on computers at private laptops. Participants will be instructed by researchers to complete the rating as honestly and accurately as possible. Each participant will rate the other members of the fraternity who participated in the first study. Each member’s photo was presented as a stimulus, along with randomized questions. These questions were on a 1 to 10 scale. They include: “How well do you know this person?” “How well do you like this person?” “What percentage of men could this man beat in a physical fight?”, “How good of a leader is this individual?” Participants also then gave an estimate of the number of sexual partners each member had in the past year.

Female Participants:

Female subjects will complete one session of rating. Investigators will instruct the participant to sit at a private laptop and complete the rating task. Participants will be presented with a photo of each fraternity member at one time on the screen in a randomized order. They will rate all

members of the fraternity on a 1 to 10 scale. Female participants will be responding to questions including “How well do you know this person?” “How well do you like this person?” “How attractive is this person for a one-night stand?” “How attractive is this person for a long term relationship?” They will also be asked if they have ever been romantically involved with the individual.

Progress of the Study:

Methods, measures, and protocols were created over the course of a few months prior to training. Measures were created or adapted from already-existing measures and questionnaires. This was done during the initial application process for IRB approval. Following approval, additional changes to the protocols and measures used were made as the study progressed through training and recruitment.

Recruitment was begun using email as the primary form of contact. After little to no success, phone contact was used as well. After contacting fraternity presidents by phone, in-person meetings were scheduled. During these meetings, the presidents of the organizations were informed of the procedures involved in the study, potential compensation, and the commitment required of them. Following the meeting with the president of the organization, lab members attended organized meetings for the members of these fraternities to recruit participants directly. With poor turnout to lab setting data collection, a switch was made to collect data on site at the houses and IRB approval was granted for this change.

Prior to data collection, lab members were trained on the procedures and protocol for the study. Lab members were shown the procedures and then practiced them on each other. These procedures were then timed and practiced on volunteer mock participants. During this process a

training video was developed for these procedures to assist in future training efforts. Training also included practice at setting up and breaking down equipment, as data would be collected on site.

Currently the study is in the data collection phase. Data collection is being completed onsite at the local fraternity houses. The two fraternities on which data are being collected have committed to allowing us to test in their houses from recruitment efforts via email, phone, and in-person meetings. The first session is done over the course of three days from 8:00AM to 12:00 PM. The second session occurs the following week, once again in the fraternity houses.

The first fraternity's data collection is underway. Its first session has been completed, and in the following week the brothers will complete their second session on site at the fraternity as well. The second fraternity will begin its first session after the second session has been completed at the first organization. A week after this first session, they will complete the second session on site as well.

After all fraternities have completed their first and second sessions, recruitment will begin on an associated sorority. These sororities will be contacted on the recommendation of the fraternities. They will then complete their rating session on site on their sorority floor in campus dorms on private laptops.

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